

CLAIM(S)What is claimed is :

- 5 1. A melt spinning process for spinning polymeric
filaments, comprising
passing a polymeric melt of a polymer formed from one
or more chain-branching agents through a spinneret to
form polymeric filaments,
10 passing the filaments to a pneumatic quench zone,
wherein a cooling gas is provided to the filaments to
cool the filaments, wherein the cooling gas is directed
to travel in the same direction as the direction of the
filaments.
- 15 2. A process as claimed in claim 1, wherein the
cooling gas is provided to the filaments in a single
stage and passes through a tapered section and a zone
of restricted dimensions to accelerate the gas.
- 20 3. A process as claimed in claim 1, wherein the
cooling gas is provided to the filaments in two stages,
and wherein the gas is accelerated by a converging
section in the quench zone.
- 25 4. A process as claimed in claim 1, further
comprising gathering the filaments to form a yarn.
5. A process as claimed in claim 1, wherein the
30 polymer comprises a polyester.
6. A process as claimed in claim 1, wherein the
polymer comprises polyethylene terephthalate.

7. A process as claimed in claim 1, wherein the chain branching agents comprise a tri or higher functional acid, alcohol, or ester.

5 8. A process as claimed in claim 1, wherein the chain branching agent comprises trimethyl trimellitate.

9. A process as claimed in claim 1, wherein a yarn formed from the produced filaments has a denier spread
10 of less than about 2 and the filaments have a denier per filament of greater than about 4.

10. A process as claimed in claim 1, wherein a yarn formed from the produced filaments has a denier spread
15 of less than about 1.5 and a denier per filament of less than about 4.

11. A process as claimed in claim 1, wherein the polymer has a laboratory relative viscosity of above
20 22.

12. A process as claimed in claim 1, wherein the filaments travel through the quench zone at a speed of greater than about 3,500 meters per minute.

25 13. A process as claimed in claim 1, wherein the filaments travel through the quench zone at a speed of greater than about 4,000 meters per minute.

30 14. Filaments produced by the process of claim 1.

15. An article formed from the filaments of claim 14.

16. A melt spinning process for spinning polymeric filaments, comprising

5 passing a polymeric melt of a polymer through a spinneret to form polymeric filaments having a denier per filament above about 4,

10 passing the filaments to a quench zone, wherein a cooling gas is provided to the filaments to cool the filaments, wherein the cooling gas is directed to travel and accelerated in the same direction as the direction of the filaments,

 whereby a yarn formed from the produced filaments has a denier spread of less than 2.

17. A melt spinning process as claimed in claim 16,
15 wherein the filaments have a denier per filament above about 5.

18. A melt spinning process as claimed in claim 16,
20 wherein the polymer comprises polyethylene terephthalate.

19. A melt spinning process for producing polymeric filaments having a denier spread of below about 2, comprising

25 passing a polymeric melt of a polymer having a laboratory relative viscosity above 22.5 through a spinneret to form polymeric filaments,

30 passing the filaments to a quench zone, wherein a cooling gas is provided to the filament array to cool the filaments, wherein the cooling gas is directed to travel and accelerated in the same direction as the direction of the filaments.

20. A method of producing polyester yarn have a denier spread of less than about 2%, comprising forming filaments from a polyester containing one or more chain-branching agents having a laboratory relative viscosity above 22.5, and forming the filaments into a yarn.
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